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or

$$(3) \quad 2(p-3)(p-4)! + 1 \equiv 0, \pmod{p}.$$

Subtracting (3) from $2p(p-4)! \equiv 0, \pmod{p}$, we have

$$3!(p-4)! - 1 \equiv 0, \pmod{p}.$$

Proceeding in like manner, we obtain successively,

$$4!(p-5)! + 1 \equiv 0, \pmod{p},$$

$$5!(p-6)! - 1 \equiv 0, \pmod{p},$$

$$\begin{array}{cccccccccc} \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\ \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\ \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \end{array}$$

$$\left(\frac{p-1}{2}\right)! \left(\frac{p-1}{2}\right)! \pm 1 \equiv 0 \pmod{p},$$

the constant term being $+1$ when $(p-1)/2$ is even and -1 when $(p-1)/2$ is odd. Hence the theorem:

If p is prime, and a is any integer less than $p-1$, then

$$a!(p-1-a)! + (-1)^a \equiv 0, \pmod{p}.$$

Wilson's theorem is the special case $a=0$, of which the above is the more general form, it being understood that $0! = 1!/1 = 1$, and that

$$(-1)^0 = (-1)^1 / (-1) = +1.$$

NOTES AND NEWS.

EDITED BY D. A. ROTHROCK, Indiana University, Bloomington, Indiana.

At the College of the City of New York, Dr. P. H. LINEHAN has been promoted to an assistant professorship of mathematics.

Dr. CORA B. HENNEL has been promoted from an instructorship to an assistant professorship of mathematics at Indiana University.

Dr. DANIEL BUCHANAN has been made professor of mathematics and astronomy at Queen's University, Kingston, Ontario.

Professor H. L. RIETZ, of the University of Illinois, has been appointed a member of the joint committee of the American Association of University Professors with the trustees of the Carnegie Foundation for the Advancement of Teaching to report upon the proposed changes in the scope of the foundation.

"The relation of mathematics to the natural sciences" is the subject of a six-page discussion in *Science*, December 15, 1916, by Professor T. E. MASON, of Purdue University.

Professor C. SMITH, head master of Sidney Sussex College, Cambridge, died on November 13, 1916, at the age of seventy-two years. Professor SMITH was known to a large number of teachers of mathematics in America through his very excellent series of college texts on algebra, conic sections, and solid analytic geometry.

In *School and Society*, December 16, 1916, Professor G. A. MILLER, of the University of Illinois, has an interesting paper on "History and use of mathematical text-books." After an introductory discussion of the general features of good and bad text-books, Dr. MILLER devotes some space to the use made of text-books, incidentally touching different methods of teaching. He also emphasizes the importance of accuracy and clearness, and the value of historical notes in mathematical text-books.

The thirty-eighth meeting of the Chicago Section of the American Mathematical Society was held at the University of Chicago on December 22 and 23, 1916, at which eleven research papers were presented by representatives of the following universities: Chicago, Illinois, Minnesota, Nebraska, Purdue and Wisconsin, and Rose Polytechnic Institute. The members present enjoyed an informal dinner together at the Quadrangle Club on Friday evening. Among topics informally discussed were (1) The contract between the Mathematical Association of America and the *Annals of Mathematics* for the enlargement of that journal and the publication in it of expository and historical articles; (2) the need in this country of careful consideration of the whole question of the history of mathematics and of combined and systematic effort in developing investigation in this line; and (3) the desirability of holding ourselves in readiness to assist the publishers of the *Revue Semestrielle* and the *Fortschritte* in case it becomes necessary, on account of the war conditions, in order to continue the publications.

The twenty-third annual meeting of the American Mathematical Society was held at Columbia University, New York, on December 27-28, 1916. Thirty-three papers were presented by representatives from twelve educational institutions including two from Canada. The session of Thursday afternoon was a joint meeting of the American Mathematical Society, the Mathematical Association of America, Section A (Mathematics and Astronomy) of the American Association, and the American Astronomical Society. At this meeting Professor E. W. BROWN, of Yale University, President of the American Mathematical Society, delivered his retiring address on "The relation of mathematics to the natural sciences," and the vice-presidential address, Section A of the American Association, on "Derivation of orbits—theory and practice," which was to have been delivered by Professor A. L. LEUSCHNER, of the University of California, was read by Professor M. W. HASKELL, of the University of California.

At the holiday meeting of the American Association for the Advancement of Science held in New York City, great interest was manifested in the programs of Section D, Engineering. On Wednesday forenoon a joint session of Section D and Section I was devoted to discussion of the social and economic question of "The advisability of adopting the metric standard of weights and measures in the United States." The program of Section D for Thursday morning was given to the presentation of papers on "Sanitary engineering"; in the afternoon of the same day a program of nine papers was provided on the general subject of "Highway engineering education"; and on the evening of the same day a joint program was devoted to the subject of "Highway engineering." On Friday the general program of Section D was continued, and in the evening the program of the section was concluded by a joint session of Section D with the American Society of Civil Engineers, the American Society of Mechanical Engineers, the American Institute of Mining Engineers, and the American Institute of Electrical Engineers, at which the topic for discussion was "The inter-relationship of engineering and pure science." In the program of Friday afternoon, Professor D. J. McADAM, of Washington and Jefferson College, presented a paper on "Mathematical education for civil engineers."

In the report of the meeting of the Kansas Section in the January issue, the Secretary of the Section inadvertently gave the wrong name as new Chairman. It should have been Professor B. L. Remick of the Kansas Agricultural College. (State.)

The editor of "Notes and News" for the MONTHLY would greatly appreciate the coöperation of members of the Mathematical Association in supplying him with items suitable for insertion in these columns. Kindly send us notices of promotions, resignations, deaths, departmental activities, mathematical clubs, local programs, summer session schedules, and notes on important mathematical contributions of general interest. Please send all such notices to D. A. ROTH-ROCK, Bloomington, Indiana.

NOTES ON THE ANNUAL MEETING OF THE ASSOCIATION.

The truly national character of the Mathematical Association of America is strongly shown in the List of Officers and Charter Members just published and distributed to all subscribers to the MONTHLY. The geographical distribution of members shows clearly the wisdom of holding the first two national meetings of the Association in the East, and the attendance upon these meetings, in Cambridge and in New York, has fully justified the selection of these meeting places. A second look at the directory will show equally clearly the desirability of holding the next national meetings in the Middle West. The Council in New York made provision toward this end by appointing a committee to act in connection with the American Mathematical Society with respect to holding a joint summer meeting in 1917 somewhere west of New York, and by voting to hold the next

annual meeting in December, 1917 in Chicago. These meetings should draw large numbers from all parts of the country and especially from the Middle West and South. The decision has since been made to hold the summer meeting in Cleveland.

The Association was exceedingly fortunate in the accommodations provided for its meetings at the Massachusetts Institute of Technology and at Columbia University. Hamilton Hall, which is the headquarters of the department of mathematics at Columbia University, proved admirably adapted to Association purposes, both for the larger gatherings and for committees and council meetings. As a side attraction, nothing could have been more interesting than the collection of portraits and medals of mathematicians belonging to Professor David Eugene Smith and put on exhibition by him between the sessions on Friday. Special credit is due to the committee on program and arrangements for the orderly and smooth progress of all matters pertaining to the meetings.

One matter in connection with meetings of the Association, whether national or sectional, deserves careful consideration, namely, the opening of all sessions sharply at the time announced. At Cambridge this was done rather successfully; in New York the result was not so successful, owing partly to uncontrollable circumstances and partly to the distractions arising from the many interesting meetings in progress on the campus. It might be a worthy New Year's resolution for the Association to establish a definite policy of starting all its meetings, including the meetings of sections, exactly on time, and of holding definitely to the program schedule in all respects.

The interest in establishing sections still grows apace. The Minnesota Section, reported in this issue, was duly organized and held its first meeting early in December. The Maryland Section has just been organized and was admitted by the council at the New York meeting. Hearty coöperation and much enthusiasm were reported in connection with this section. The Committee on Sections has also authorized the establishment of a section in Kentucky. Preliminary steps were taken at a small gathering in Chicago on December 23 toward the organization of a section in Illinois and more definite plans are soon to be put into action. Other sections are under consideration in various parts of the country. The Council Committee on Sections is likely to become one of the most important in the near future, not only in respect to the organization of new sections but also in coördinating the work of the sections, in stimulating their activities, and in preparing and distributing types of programs and discussions, and possibly in providing representative speakers to visit the section meetings, to give assistance in local plans, and to stir up activity and enthusiasm.

The plan of coöperation with the *Annals of Mathematics*, which had already been unanimously approved by a mail vote of the Council, was still further perfected in joint conferences between the committee of the Association and the editors of the *Annals*. It was agreed that the plan should go into operation with the final number of the present volume of the *Annals*, which is to be issued early in May and is to contain an expository paper by Professor L. E. Dickson,

of the University of Chicago, on Fermat's last theorem and other matters of historical interest in connection with algebraic number theory. A communication setting forth the details of this plan will be issued early in March by the editors of the *Annals* and the committee of the Association. Only warm commendation of this plan was heard on every hand at the New York meeting. An informal referendum showed that between sixty and seventy persons were ready to subscribe to the *Annals* under the half-rate offer to be extended to members of the Association. This communication will be sent to all members of the Society as well as to the members of the Association.

About fifty scientific societies are affiliated with the American Association for the Advancement of Science. Once in four years at the annual meeting of the American Association there is held a convocation of these affiliated societies, such as took place in New York City during the last week of December, 1916. As an inducement to members of the affiliated societies to join the American Association, the entrance fee of five dollars was remitted by a special order during the year 1916. This privilege has now been further extended by a special resolution at the New York meeting, to include all new members of any affiliated society who may be elected to membership in the American Association within one year of their admission to the affiliated society. This privilege would then be applicable to the charter members of the Mathematical Association of America up to April first, 1917, since the charter membership list closed on April first, 1916. The dues in the American Association are three dollars per year and all members receive the weekly journal *Science*.